Digital Information Literacy Competency among Lecturers of Sultan Ageng Tirtayasa University in Supporting Research and Scientific Publication

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Abstract- Technological developments of the Industrial Revolution 4.0 era have changed landscape higher education landscapes. Internet has become the main sources for improving the quality of teaching and research. But the research quality improvement depends on the digital information literacy competency of the lecturers. This research aims to measure digital information literacy competency among lecturers in the University of Sultan Ageng Tirtayasa (Untirta), Banten. This was conducted with a quantitative approach with survey methods. The samples were 119 lecturers at Untirta with a margin of error of 8% and a 95% confidence level through the stratified random sampling method. Data collection techniques were conducted through face-to-face interviews using questionnaires. This research finds that the percentage of lecturers in Untirta who have published books as much as 54%, articles in national journals 88%, articles in accredited national journals 48%, articles in international journals 31% and articles in "reputable international journals" 27%. The hypothesis of this research is Ha: the level of digital information literacy Untirta lecturers is the highest 68% of expectations and H_0: the level of digital information literacy Untirta lecturers are more than 68% of expectations. The T test results show that t count = 12.283. T table is obtained with df = 118, sig 5% (1 tailed) = 1,657. Because t count $\geq$ from t table (12.823 > 1.657), then H_0 is accepted, meaning that the level of digital information literacy of Untirta lecturers is at most 68% not proven, even reaching 85%. Therefore it can be concluded that the level of information literacy competency is good. This has become an important capital for improving the quality of research by Untirta lecturers. However, 70% of lecturers still experienced obstacles, especially in access to international journals (43%) and English language skills (21%). Though Untirta subscribes to Springerlink, an international journal database, the users among lecturers were only 33%. So the socialization and training in using international journals as a reference is very important, especially as the main source for writing articles in international journals.

Keywords: Digital information literacy, higher education, research quality, scientific publication
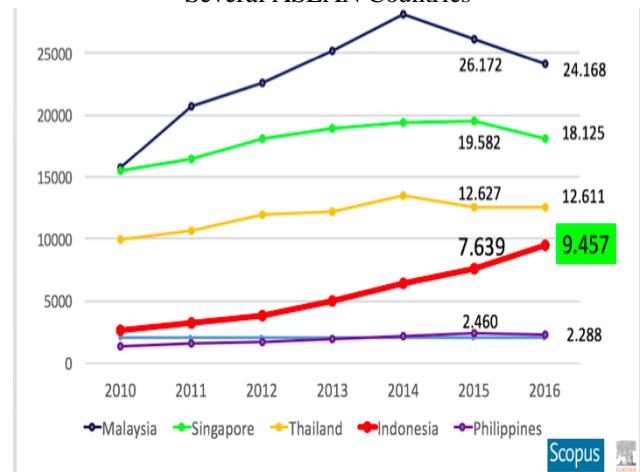
I. INTRODUCTION

1.1. Background

Lecturers in Indonesia actually have three main tasks which are referred to as higher education tridharma, namely education and teaching, research and community service. The three besides being the main tasks, they are also a determining factor for the success of a lecturer's academic career. Since 2012, it has been realized that Indonesia has lagged behind in terms of scientific publications compared to Malaysia.

The latest data shown in Maftuh's exposure shows that despite the increase, the number of scientific publications is still low compared to several countries in Southeast Asia [1].

Figure 1
Comparison of Number of Scientific Publications in Several ASEAN Countries

This is inseparable from the development of the world of research that is increasingly attached to the digital world. If in the past library resources were in the form of printed books or journals, now they are in the form of digital sources such as e-books, e-journals, and other sources. Moreover, the need to write in international journals also requires more up-to-date sources.

The shift from traditional information literacy to digital-based information literacy is certainly not easy to do. There are various aspects that become considerations such as culture, facilities, and language constraints. While the need to adapt to the digital world is fast. For example, all new lecturer publications can be assessed if published online.

This study will find out the level of digital information literacy of lecturers at the Sultan Ageng Tirtayasa University in supporting scientific research and publications. This is important to ensure that the program to improve the quality of research and publications is truly based on

problems in the field, in this case the quality of digital information literacy.

1.2. Literature Review

Information literacy in higher education states the importance of the role of information in our daily lives and is very important for higher education institutions. Information revolution has greatly enhanced the ability to access and use information, using various sources including information published electronically, people are required to have certain abilities (in addition to the ability to read and write) to fully utilize these resources.

According to Elhassani citing Haberle (2002), scholars emphasize that society needs multi-skilled learners, who are able to think critically, pose and solve problems, and become independent and lifelong learners [2]. It is also important that scholars gain an understanding of the technological environment in which information sources are included and used, because it is not only the discovery of information, but the ability to use it. According to Doyle quoted by Elhassani (2015), it is important that the University must provide opportunities to ensure that all scholars obtain the competencies needed to know how to navigate the web and find quality resources, to form questions, to access potential sources of information, to critically evaluate information for accuracy and quality, for organizing information, and finally, for using that information to do something, the last and most valuable step in the process [2].
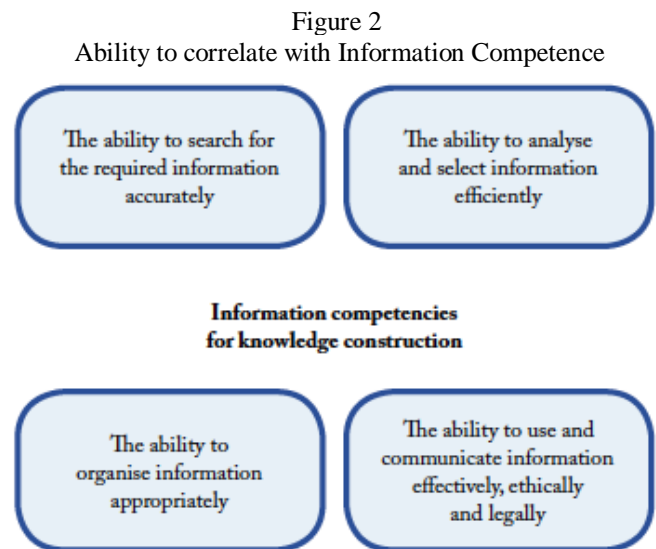
The need for information literacy instruction is increasingly important because of the ubiquitous electronic resources and significant increase in internet usage as a source of information. Beaubien (2009) cited Elhassani (2015) Information Literacy is "a set of skills that includes finding information effectively; managing the abundance of information available; thinking critically about resources; synthesizing and incorporating information into one's knowledge base; creatively expressing and effectively communicate new knowledge, use information ethically, and use knowledge for a better society [2].

The American Library Association conveys the definition of information literacy / Information Literacy as the ability to recognize when information is needed and has the ability to search, evaluate, and effectively use the information needed [3]. Some characteristics of individuals who have information literacy competencies (Information Literate), namely:

1. *Determine the extent of information needed*
2. *Access the needed information effectively and efficiently*
3. *Evaluate information and its sources critically*
4. *Incorporate selected information into one's knowledge base*
5. *Use information effectively to accomplish a specific purpose*
6. *Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally*

De Pablos revealed that the Information Literacy Competency Standards for Higher Education requires the following capabilities: to search for information that is needed accurately, to analyze and select information efficiently, to regulate information appropriately, and to use and communicate information effectively, ethically and legally, with the aim of building knowledge [4].

Figure 2
Ability to correlate with Information Competence

The ability to search for the required information accurately

The ability to analyse and select information efficiently

Information competencies for knowledge construction

The ability to organise information appropriately

The ability to use and communicate information effectively, ethically and legally

Sources: De Pablos (2010), Higher Education and The Knowledge Society: Information and Digital Competencies.

The concept of digital literacy is popularized by Gilster [5], which defines digital literacy as "the ability to understand and use multiple formats from various sources when it is presented via computers." Meanwhile the Depuis [5]. Literacy of digital information itself can be understood as information literacy in the digital world. Information is not only available in print, but in digital form. He then not only in writing (text) but also sounds, pictures, and even films.

Hegarty, et.al, (2010) defines digital information literacy (Digital Information Literacy, DIL) as the ability to recognize the need for, access to, and evaluation of electronic information. Those who are digital literates can confidently use, manage, create, cite and share digital information resources in an effective way. The way information is used, created and distributed shows understanding and recognition of aspects of cultural, ethical, economic, legal and social information. Digital literacy shows openness, problem solving skills, critical scrutiny, technical ability and willingness to collaborate and keep abreast of developments in the context in which they use information.

In the world of science that is increasingly based on the digital world, digital information literacy is one of the most important things to encourage the quality of research and publications, so that it is even more equal and even advancing with colleagues abroad.

Digital competency is defined as a set of elements of knowledge, ability, disposition and behavior that allow individuals to know how ICT works, for what they are and how they can be used to achieve certain goals [6]; [7]; [8]; [9]; [10].

Competence in digital information literacy in the world of higher education in Indonesia gets its context when in 2018, the Ministry of Research and Technology Ministry of Research and Technology set the theme: Ristek Dikti in the Era of Industrial Revolution 4.0 [10].

Determination of this theme has great potential to boost the world of higher education in Indonesia when problems at the university level are well understood. One of the urgent issues is understanding how the quality of digital information literacy in Indonesia. Untirta as a State University which is a public institution is one of the fastest growing universities. An understanding of digital literacy among lecturers will contribute greatly to the discovery of the best strategies to improve the quality of publications.

II. METHODS

The type of quantitative research conducted is descriptive. The data needed in this study uses quantitative data. This study uses a quantitative approach with a survey method. Survey is a procedure in quantitative research where the researcher takes a portion of the sample or the entire population in order to describe attitude, opinion, behavior or characteristics of a population [12].

This study aims to measure the level of digital information literacy of lecturers at Sultan Ageng Tirtayasa University. Therefore the research method with a quantitative approach is very appropriate to be used in this study.

2.1. Population and Sample

The population in this study were lecturers at Sultan Ageng Tirtayasa University. The study sample used cluster random sampling, using the departments at Untirta as a sample framework. With a total of 661 lecturers spread across 50 department, the sample required for the confidence level is 95% and the margin of error of 8% is 119 people. Furthermore, the selected lecturers in each departments will be determined through simple random sampling based on the serial number data of the lecturers in Forlap Dikti. Thus accurate data will be obtained based on the distribution based on the departments at Untirta.

2.2. Variables and Indicators

The variables of this study are Digital Information Literacy and sub-variables based on the components forming information literacy [3], namely:

Table 1
Sub Variable and Indicator

No	Sub-Variable	Indicator
1	Access the needed information effectively and efficiently	1. Have broadband internet access on campus 2. Having internet access via mobile. 3. Have internet access on campus. 4. Have access to electronic journals 5. Have access to electronic books

No	Sub-Variable	Indicator
2	Evaluate information and its sources critically	1. Select information sources selectively as a source of information. 2. Re-checking the information I got from the website. 3. Only use sources of information from trusted electronic journals and electronic books.
3	Incorporate selected information into one's knowledge base	1. Placing information from electronic journals and electronic books to update lecture material. 2. Placing information from electronic journals and electronic books as a reference for research
4	Use information effectively to accomplish a specific purpose	1. Information sought in accordance with the field of science 2. Information sought to answer problems according to the field of science 3. The information sought is used to develop the field of science.
5	Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally	1. Understand copyright and obey it. 2. Only use legal information sources. 3. Do not share the downloaded paper with colleagues

2.3. Hypothesis and Hypothesis Test

In this study the hypothesis used by researchers is a descriptive hypothesis. The formulation of the hypothesis in this study are:

1. Level of Digital Information Literacy Competence among University of Sultan Ageng Tirtayasa's Lecturers in Supporting Research and Scientific Publication is more than or equal to 68%. The null hypothesis in the form of statistics can be written as follows:
   H0: $\mu \geq 68\%$

2. Level of Digital Information Literacy Competence among University of Sultan Ageng Tirtayasa's Lecturers in Supporting Research and Scientific Publication is less than 68%. Alternative hypotheses in the form of statistics can be written as follows:
   Ha: $\mu < 68\%$

Testing the hypothesis in this study using a t-test. T-test is used to test descriptive hypotheses of one or more variables whose data are in the form of intervals or ratios. To analyze the level of Digital Information Literacy Competence among University of Sultan Ageng Tirtayasa's Lecturers in Supporting Scientific Research and Publication,

t-test tests for one sample or one variable were used in descriptive hypothesis testing.

The hypothesis in this study is the null hypothesis (H0) lowest of 68% ($\geq$) and the alternative hypothesis (Ha) is less than 68% (<), so that the left-hand test is used. Thus the provisions apply namely:

a) If t count $\geq$ t table then H0 is accepted and Ha is rejected

b) If t count <t table then H0 is rejected and Ha is accepted

III. RESULTS AND DISCUSSIONS

3.1. Result

3.1.1. Identity of respondents

In this study obtained results in the form of numbers from the identity of the respondent. The results are:

Table 2
Identity of respondents

Distribution of Respondents by Age		
	F	%
18-37 years (millenial)	54	45%
38-53 years (X generation)	59	50%
54 years above (baby boomer)	6	5%
	119	100%
Distribution of Respondents Based on Latest Education		
	F	%
S2 (Master)	92	77%
S3 (Doctor)	27	23%
	119	100%
Distribution of Respondents by Gender		
	F	%
Male	64	54%
Female	55	46%
	119	100%

Based on the table above, it was found that 50% of respondents in this study belonged to the 38-53 year age group that we commonly call Generation X. Then 45% of the respondents came from Millennial Generations which belonged to the 18-37 year age group. While the remaining 5% of respondents came from the age group 54 years and above who entered the category of baby boomers.

Then the distribution of respondents based on recent education, the most respondents in this study came from the group with a master degree level as much as 77%. The remaining 23% came from groups with a doctoral degree level. While the distribution of respondents by sex was mostly dominated by male sex by 54%. While female sex is 46% of respondents.

Table 3
Identity of Respondents based on level and Functional Lecturers

	TP	AA	L	LK	Prof	F	%
IIIA	3	5	1	0	0	9	8%
IIIB	5	22	7	0	0	34	29%
IIIC	3	0	37	1	0	41	34%
IIID	1	0	8	4	0	13	11%
IVA	1	0	1	12	1	15	13%
IVB	0	0	0	0	0	0	0%
IVC	0	0	0	5	0	5	4%
IVD	0	0	0	1	1	2	2%
F	13	27	54	23	2	119	100%
%	11%	23%	5%	19%	2%		100%

Besides the distribution of respondents based on class and lecturer functional positions, the respondents were mostly in the IIIC level as much as 34%, followed by the IIIB level as much as 29%. In addition, IVA level became the third group that dominated respondents by 13%. Whereas seen from the functional position the group that most dominates the respondents is the Position of Lector (L) as much as 45%. Followed by the *Asisten Ahli* (AA) group of 23%. Then the *Lektor Kepala* Position (LK) group is 19%. The rest is followed by the *Tenaga Pengajar* (TP) and Professor groups of 11% and 2% respectively. While the combined levels and functional positions were the most combination of IIIC / Lector 37 people or as much as 31.1%.

Table 4
Productivity of Untirta Lecturer's Scientific work

	Number of books ever published	The number of national journals ever publiched	Number of accredited national journals ever published	Number of international journals ever published	Number of reputed international journals ever published	Mean
Non productive	46%	12%	52%	69%	73%	50%
Productivity	54%	88%	48%	31%	27%	50%

This study found that the productivity of Scientific Work for Untirta's Lecturers on average as many as 50% of respondents had already written scientific work in various channels, books and journals, national to international level. As many as 54% of respondents have already written a published book and obtained an ISBN. Then as many as 88% of respondents have published their writings in the national Journal. In addition there were 48% of respondents who had published their writings in an accredited National Journal. While 31% of respondents have published their writings in an International Journal. Finally, 27% of respondents have published their writings in reputable International Journals.

3.1.2. Hypothesis Test

While the T test parameters are based on the left-hand test, namely:

If t count> t table then H0 is accepted, and Ha is rejected

If t count <t table then H0 is rejected, and Ha is accepted

The results of the T test calculations based on SPSS can be seen in the following table:H0: $\mu \geq 68\%$

Ha: $\mu < 68\%$

While the T test parameters are based on the left-hand tail test, namely:

If t count> t table then H0 is accepted, and Ha is rejected

If t count <t table then H0 is rejected, and Ha is accepted

The results of the T test calculations based on SPSS can be seen in the following table:

Table 5
Results of calculation of T test

	One-Sample Test					
	Test Value = 13					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Dig. Litrcy	12.823	118	.000	3.109	2.63	3.59

The left-hand tail test results above show that t count = 12,823. T table is obtained with df = 118, sig 5% (1 tailed) = 1,657. Because t count> from t table (12,823> 1,657), or significance test 0,000 <0.05, H0 is accepted, meaning Digital Literacy Competence among University of Sultan Ageng Tirtayasa's Lecturers in Supporting Research and Scientific Publication more than or equal to 68%.

In this study, the main thing that researchers need to do is answer the formulation of the descriptive problem that was previously formulated. The formulation of the problem that must be answered is how much the Level of Digital Information Literacy Competence among University of Sultan Ageng Tirtayasa's Lecturers in Supporting Scientific Research and Publication?
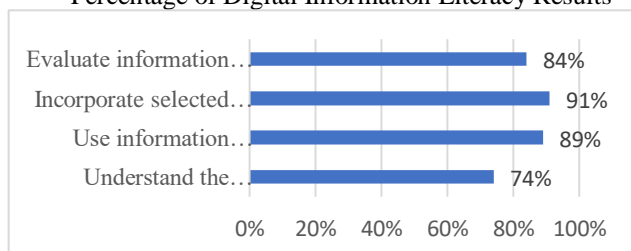
The ideal score of the variables in this study was 2261 and the score of the research scores obtained in this study was 1917. The Level of Digital Literacy Competency among Lecturers of Sultan Ageng Tirtayasa University in Supporting Research and Scientific Publication was 2261: 1917 = 0.847 rounded to 0.85 and dipped at a percentage of 85%. Based on these calculations, the answer to the descriptive problem which is the aim of the study is how much the level of Digital Information Literacy Competency among Lecturers of Sultan Ageng Tirtayasa University in supporting Scientific Publication and Research is 85% higher than the hypothesis proposed at 68%.

3.2. Discussion

Based on the testing that the researchers have done, the Digital Literacy Competency Research in the Sultan Ageng Tirtayasa University Lecturer in supporting the Research and Scientific Publication amounted to 85%. The following is the percentage of results per sub-variable Digital Information Literacy that the researcher uses:

Diagram 1
Percentage of Digital Information Literacy Results

Based on the diagram above, the highest number is in the sub-variable "combining selected information into one information base" of 91%. While the lowest number is in the sub-variable "understanding economic, legal and social aspects of the use and access of information and using information ethically and legally" by 74%. Therefore understanding the economic, legal and social aspects of the use and access of information and using information ethically and legally needs to be improved. Obtained the fact that downloading sources from illegal sources is still done and then shared with colleagues. Even though they understand downloading from illegal sources and sharing them is copyright infringement. This is evidenced by the results of a survey conducted on respondents, namely:

Table 6
Resources on the internet

No	Resources	F	%
1	Search Engine (Google, Bing, et.al)	107	90%
2	Springer Link	46	39%
3	e-resesource Perpusnas RI	42	35%
4	Sci-Hub	30	25%
5	ebook3000	28	24%
6	lib-gen	18	15%
7	Bookfi	15	13%
8	bookSc	12	10%
9	Other source	17	14%

Respondents in this study stated that 70% of lecturers experienced obstacles in the use of electronic journals and books. The most prominent thing is the obstacles in English language and the limited access to journals and electronic books widely and completely. Untirta only subscribes from Springer Link sources. The lecturers knew that Untirta had a Springer Link database of 56% but only 33% of lecturers had Springer link accounts. In addition, the campus facilities have not yet been felt by the lecturers and the quality is still low.

IV. CONCLUSION

This study produces several conclusions, namely based on the T test, the hypothesis H0 is accepted which reads Digital Information Literacy Competence among University of Sultan Ageng Tirtayasa's Lecturers in Supporting Research and Scientific Publication more than or equal to 68%. While the level of Digital Information Literacy Competency among Lecturers of Sultan Ageng Tirtayasa University is 85%. The obstacles encountered by Untirta lecturers were the obstacles in English language and the limited and extensive access to journals and electronic books. In addition, the campus facilities have not yet been felt by the lecturers and the quality is still low.

The solution needs to be done by Untirta in developing the quality of Digital Information Literacy Competencies among Untirta Lecturers, namely increasing socialization and training lecturers in accessing and using international journals to be important. More specifically its use as the main source in writing articles in international journals.

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